

We claim:

1. An exhaust emission purifying apparatus for an engine, comprising:
 - a reduction catalyst disposed in an engine exhaust system, for reductively purifying nitrogen oxides with a reducing agent;
 - a reducing agent oxidation catalyst disposed on an exhaust downstream side of said reduction catalyst, for oxidizing the reducing agent passed through said reduction catalyst;
 - a storage tank storing therein the reducing agent;
 - a reducing agent supply device that supplies the reducing agent from said storage tank to said reduction catalyst;
 - a first discharge-forcing device that forcibly discharges a gas in an upper space of said storage tank to an intake system or said exhaust system on an upstream side of said reducing agent oxidation catalyst;
 - a temperature detecting device that detects a temperature of said reducing agent oxidation catalyst; and
 - a first operation control device that operates said first discharge-forcing device when the temperature detected by said temperature detecting device reaches an activating temperature for said reducing agent oxidation catalyst or above.
2. The apparatus according to claim 1, wherein said first operation control device operates said first discharge-forcing device for a predetermined period of time.
3. The apparatus according to claim 1, wherein said first discharge-forcing device is an electric fan disposed on piping which communicatively connects the upper space of said storage tank to the intake system or the exhaust system on the upstream side of said reducing agent oxidation catalyst.
4. The apparatus according to claim 3, wherein said piping is disposed with a check valve which is opened only in a direction in which the gas in the upper space of said storage tank is discharged to the intake system or the exhaust system.

5. The apparatus according to claim 1, wherein said first discharge-forcing device comprises:

a venturi disposed in the intake system or the exhausted system, on the upstream side of said reducing agent oxidation catalyst; and a switching valve disposed on piping which provides a fluid communication between the upper space of said storage tank and said venturi, and

said first operation control device that opens said switching valve when the temperature detected by said temperature detecting device reaches the activating temperature for said reducing agent oxidation catalyst or above.

6. The apparatus according to claim 1, wherein said temperature detecting device detects the temperature of said reducing agent oxidation catalyst indirectly via the exhaust emission temperature on the upstream side of said reducing agent oxidation catalyst.

7. An exhaust emission purifying apparatus for an engine, comprising:
a reduction catalyst disposed in an engine exhaust system, for reductively purifying nitrogen oxides with a reducing agent;

a storage tank storing therein the reducing agent;

a reducing agent supply device supplying the reducing agent stored in said storage tank to said reduction catalyst;

a second discharge-forcing device forcibly discharging the gas in an upper space of said storage tank;

an adsorbing device temporarily adsorbing thereto the gas forcibly discharged by said second discharge-forcing device; and

an oxidation catalyst oxidizing the gas desorbed from said adsorbing device.

8. The apparatus according to claim 7, further comprising:

a reducing agent temperature detecting device detecting the temperature of the reducing agent in said storage tank; and

a second operation control apparatus that operates said second discharge-forcing device when the temperature of the reducing agent detected by said reducing agent temperature detecting device is equal to or higher than the first predetermined temperature.

9. The apparatus according to claim 8, wherein said second operation control device operates said second discharge-forcing device for a predetermined period of time.

10. The apparatus according to claim 7, further comprising:
a catalyst temperature detecting device that detects the temperature of said oxidation catalyst; and
a catalyst activating device that activates said oxidation catalyst based on the catalyst temperature detected by said catalyst temperature detecting device.

11. The apparatus according to claim 10, further comprising;
a heating device that heats said oxidation catalyst,
wherein said catalyst activating device controls said heating device so that the catalyst temperature detected by said catalyst temperature detecting device reaches the activating temperature for said oxidation catalyst or above.

12. The apparatus according to claim 11, wherein said catalyst activating device stops an operation of said heating device when the catalyst temperature detected by said catalyst temperature detecting device reaches the second predetermined temperature or above.

13. The apparatus according to claim 7, wherein said adsorbing device is mordenite, cobalt-supported mordenite or activated carbon.

14. The apparatus according to claim 7, wherein said oxidation catalyst is an electrically heated honeycomb catalyst.

15. An exhaust emission purifying apparatus for an engine, comprising:
a reduction catalyst disposed in an engine exhaust system, for reductively purifying nitrogen oxides with a reducing agent;
a storage tank that stores therein the reducing agent;
a reducing agent supply device that supplies the reducing agent stored in said storage tank to said reduction catalyst;

a heating device that circulates a heating medium heated by said engine, within said storage tank, to heat said reducing agent stored in said storage tank;

a blocking device that blocks a passage which leads said heating medium into said storage tank;

a heating medium temperature detecting device that detects the temperature of said heating medium; and

first control means for controlling said blocking device to block said passage, when the heating medium temperature detected by said heating medium temperature detecting device is higher than the third predetermined temperature.

16. The apparatus according to claim 15, further comprising:

a reducing agent temperature detecting device that detects the temperature of the reducing agent stored in said storage tank; and

second control means for controlling said blocking device to block said passage, when the reducing agent temperature detected by said reducing agent temperature detecting device is equal to or higher than the fourth predetermined temperature.

17. The apparatus according to claim 15 or claim 16, further comprising:

third control means for controlling said blocking device to forcibly cancel the blocking of said passage for a predetermined period of time, immediately after an operation of said engine is started, and also, when the heating medium temperature detected by said heating medium temperature detecting device is higher than the freezing temperature of the reducing agent.

18. The apparatus according to claim 15, wherein said blocking device is manually controllable, to cancel the blocking of said passage.